RECEIVED

NOV 20 2002

TC 1700

AF/1700

OIPE

NOV 18 2002

PATENT & TRADEMARK OFFICE

Patent

HM-394PCT

#15

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: August Sprock

Serial No: 09/744,485

Filed: March 12, 2001

For: METHOD AND INSTALLATION FOR PRODUCING DUAL-PHASE STEEL

Examiner: Deborah Yee

Art Unit: 1742

BOX AF
Assistant Commissioner for Patents
Washington, D.C. 20231

SUBMISSION OF BRIEF ON APPEAL

SIR:

Submitted herewith is a Brief On Appeal in triplicate in support of the appeal filed September 11, 2002.

A check in the amount of $320.00 to cover the fee pursuant to 37 CFR §1.17 (f) is enclosed.

Any additional fees or charges required at this time in connection with the application may be charged to Patent and Trademark Office Deposit Account No. 11-1835.

Respectfully submitted,

FRIEDRICH KUEFFNER

By [signature]

Friedrich Kueffner
(Reg. No. 29,482)
317 Madison Avenue, Suite 901
New York, New York 10017
(212) 986-3114

Dated: November 12, 2002
ENCLS: CHECK $320.00

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D. C. 20231, on November 12, 2002

By: [signature] Date: November 12, 2002
Friedrich Kueffner

RECEIVED
NOV 2 0 2002
TC 1700

#15

Patent

HM-394PCT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	August Sprock
Serial No:	09/744,485
Filed:	March 12, 2001
For:	METHOD AND INSTALLATION FOR PRODUCING DUAL-PHASE STEEL
Examiner:	Deborah Yee
Art Unit:	1742

BOX AF
Assistant Commissioner for Patents
Washington, D.C. 20231

BRIEF ON APPEAL

S I R:

This Brief is submitted in support of the Appeal filed September 11, 2002 from the Examiner's Final Rejection of claims 5 to 7, as set forth in the Office Action dated May 3, 2002.

REAL PARTY IN INTEREST

The present application is owned by SMS Schloemann-Siemag AG by virtue of an assignment recorded April 23, 2001, under reel 011746/frame 0352.

RELATED APPEALS AND INTERFERENCES

There are no presently pending related appeals and interferences.

STATUS OF CLAIMS

Claim 5 is the only claim in the application and is the claim on appeal.

STATUS OF AMENDMENTS

Original claims 1-4 were deleted with an amendment field March 5, 2002, and replaced by new claims 5-7. Claims 6 and 7 were cancelled in an amendment after rejection filed July 30, 3003. As indicated by the Examiner in the Advisory Action dated August 14, 2002, the amendment after final rejection was entered for purposes of appeal.

SUMMARY OF THE INVENTION

The present invention is directed to a method for producing dual-phase steels.

As described in the first paragraph on page 1 of the specification, the present invention is specifically directed to a method for producing dual-phase steels from the hot-rolled state with a two-phase microstructure of 70 to 90 % ferrite and 30 to 10 % martensite by a controlled temperature guiding and defined cooling strategy during the cooling of the steels, inter alia by means of water cooling after their finish rolling, wherein in a first cooling stage at a first cooling rate the cooling curve enters the ferrite region and in a second cooling stage at a second cooling rate faster than the first slow cooling rate further cooling is carried out to temperatures below the martensite starting temperature.

In accordance with the present invention, as described in the second full paragraph on page 3 of the specification, the first cooling stage is carried out at a cooling rate of 20-30 K/s. As described in the paragraph bridging pages 6 and 7 of the specification, and as illustrated in the drawing, the cooling stretch for carrying out the first cooling stage is comprised of

several water cooling stages 7 positioned successively at a spacing from one another. The cooling curve 10 is allowed in the first cooling stage to enter the ferrite region at a temperature still so high that the ferrite formation takes place quickly. Before beginning the second cooling stage, which follows without intermediate air cooling and holding time directly after the first cooling stage, already at least 70 % of the austenite are transformed to ferrite by continuing cooling of the first cooling stage during the transformation of the austenite into ferrite up to the desired ferrite contents of at least 70%.

ISSUE PRESENTED FOR REVIEW

Whether claim 5 is unpatentable under 35 U.S.C. §103(a) over Japanese patent 57-104650 alone or in view of Umeno et al. or Plata et al.

ARGUMENT

It is respectfully submitted that the Examiner's rejection of claim 5 under 35 U.S.C. §103(a) as being unpatentable over the Japanese patent alone or in view of Umeno et al or Plata et al. because the references do not disclose or suggest the present invention as claimed.

As discussed above, claim 5 is directed to a method for manufacturing dual-phase steels of a dual-phase microstructure of 70-90 % ferrite and 30-10 % martensite from the hot-rolled state via controlled temperature guiding and defined cooling strategy. The first cooling stage is carried out in a cooling stretch of water cooling stages arranged successively at a spacing behind one another at a cooling rate of 20-30 K/s, wherein the cooling curve enters the ferrite range with still such a high temperature that ferrite formation can take place quickly, and wherein, before beginning the second cooling stage which follows without intermediate air cooling and holding time directly after the first cooling step, already at least 70 % of the austenite has been transformed into ferrite and during the transformation of the austenite into ferrite up to the desired ferrite contents of at least 70 % the cooling of the first cooling step is continued (see 2nd to last and last paragraphs of page 3 and 1st paragraph of page 4 of the instant specification).

It is also an important feature of the method according to the invention that the second cooling step (the fast cooling step) is carried out without performing any intermediate cooling, for example, air cooling. This is explained in detail on page 5, 1st through 3rd paragraphs, of the specification.

In the introductory portion of the present invention different measures for producing dual-phase steels have been described, and it has been discussed which methods can achieve the goal of 70 % ferrite formation. The present invention provides a new method for achieving a ferrite contents of at least 70 % in a reliable way. The so-called dispersed cooling which finds use in this connection is also important in this context.

Claim 5 thus provides a clear teaching to perform cooling in the first stage such that at least 70 % ferrite is present before the second cooling stage is begun. The method according to the invention does not relate to the manufacture of dual-phase steels with the aforementioned contents but resides in a special method in order to reliably achieve a dual-phase steel of the desired ferrite contents.

It is the Examiner's position that the abstract of Japanese reference 57-104650 discloses a method for producing a steel having a dual-phase microstructure consisting of ferrite and 1-30 % martensite by subjecting hot rolled steel to cooling at 5-30°C per second followed by a second faster cooling at > 30°C per second. The examiner furthermore points to the paragraph above table 1 where first cooling is disclosed at 20°-30°C per second

followed by faster cooling at 60°C per second. The Examiner also refers to examples 4-9 in table 2 on page 274 pointing out that ferrite and 10-25 % martensite are present and that these values meet applicant's claimed microstructure. In the Response to Arguments, the examiners states that it is her position that the temperature taught by the Japanese reference will inherently process at least 70 % austenite transformation into ferrite because the end products contain over 70 % ferrite as evidenced by the end product examples 4-8 in table 2 on page 274.

JP 57-104650 prescribes to carry out the first cooling to a temperature between the Ar_1 point and 550°C, wherein the cooling speed is within a wide range of 5 to 30°C/sec. This is followed by a second rapid cooling at $\geq$ 30°C/sec to 350-500°C.

Accordingly, the reference teaches cooling to a **specific temperature** in the first slow cooling step. In contrast to this, the present invention clearly prescribes that a particular parameter of the microstructure (ferrite contents) must have reached a certain value in the first cooling stage before the second cooling stage is begun. The cited prior art never mentions that a specific ferrite contents must be present before the second cooling step is initiated. The prior art teaching of cooling to a certain temperature cannot make obvious the claimed

step of cooling to a certain ferrite contents since there is no inherent or disclosed correlation between the proposed temperature and the resulting ferrite contents of the end product. The invention proposes to carry out the first cooling step to a certain ferrite contents - this cannot be obvious in view of the ferrite contents of the prior art end product because there is no way of knowing if this ferrite contents is present at the beginning of the second cooling step. The final ferrite contents listed in the table 2 could well be the result of the second cooling step without the ferrite contents of 70 % having been reached before the second cooling step absent any disclosure to the contrary. The examiner's assertion that the ferrite contents is inherent to the process is based on the unfounded assumption that the ferrite contents of the end products is reached after the first cooling step. The examiner focuses only on the disclosed temperature range/cooling rate disclosed in the prior art; she ignores completely the condition defined in claim 5 according to which the second cooling step should be started only once the ferrite contents has reached 70 %.

Moreover, it is questionable whether the cooling action carried out according to the Japanese reference with the temperature limits as prescribed actually realize the minimum contents of 70 % ferrite. Since in the Japanese reference only

provides specific values for the martensite contents (1-30 %), it is unclear whether the remainder is actually ferrite or whether other components are present also.

The examiner states that the temperature taught by the Japanese reference would inherently produce at least 70 % austenite transformed into ferrite because the end product contains over 70 % ferrite as evidenced by end product examples 4-8 in table 2 on page 274. It is respectfully submitted that **all of the examples** in this table have been subjected to the cooling steps and cooling rates as taught by Japanese reference. Therefore, if examiner's statement that **inherently** the teachings in regard to the temperatures of the cooling actions of this reference would result in over 70 % ferrite, **all of the examples** in table 2 would have to show a ferrite contents of more than 70 %. However, example 13 shows a martensite contents of 50 % and thus presumably a **ferrite contents (F) of 50 %**; example numeral 14 shows a martensite contents of 40 % and thus presumably a **ferrite contents (F) of 60 %**, examples 15 and 16 do not give any martensite percentages and therefore provide no indication as to the ferrite contents; example 17 shows a 40 % martensite contents and thus presumably a **ferrite contents (F) of 60 %**.

Therefore, the examiner's statement that the suggested

temperature ranges and cooling rates of the prior art method **inherently** cause at least a 70 % conversion of austenite into ferrite is without merit.

As is apparent from the values of table 2 in combination with the disclosure of table 1 relating to the composition of the steel alloys tested, the steel composition and variations in percentages of the various elements contained in the steel alloy are apparently decisive in regard to the final ferrite structure of the steel alloy - not the cooling process carried out with the prescribed cooling rates and at the prescribed temperatures.

Moreover, note that the entire premise of the disclosed process is its application to a **very specific steel composition** - the method is not a generally applicable cooling method with which a certain ferrite contents can be generated for a given steel composition. Examples 11 through 19 in table 1 show compositions which are outside of the specified percentage range for the elements; these examples in particular show the ferrite contents being lower than the 70 % range.

The Japanese reference can only teach that for a specific steel alloy containing exactly the specified percentages of elements in the steel alloy <u>and</u> the specified Si/Mn percentage

ratio, a martensite contents from 1 to 30 % can be achieved by performing cooling with the described parameters. See also the "Purpose" declared in the Abstract of JP 57-104650: " ... by properly controlling the hot rolling and cooling conditions of a steel having an especially regulated S content and specified relation between Si and MN.". There is no **inherent teaching** of providing at least 70 % ferrite by performing the cooling process as disclosed in the Japanese reference.

The secondary references have been applied only to show that cooling by a series of cooling sprays or adjustable cooling sprays is known. These references do not provide any teaching in regard to the cooling parameters as claimed in claim 5.

In view of the foregoing, it is submitted that the claim is allowable over the references relied on by the Examiner and the Board is respectfully requested to reverse the decision of the Examiner.

Respectfully submitted,

By Fr Kt ____________________

Friedrich Kueffner
Reg. No. 29,482
317 Madison Avenue, Suite 910
New York, New York 10017
(212) 986-3114

Dated: November 12, 2002

O I P E
NOV 1 8 2002
PATENT & TRADEMARK OFFICE

RECEIVED
NOV 2 0 2002
TC 1700

MAILING CERTIFICATE

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D. C. 20231, on November 12, 2002.

By: Fr Kff
Friedrich Kueffner

Date: November 12, 2002

RECEIVED
NOV 2 0 2002
TC 1700

APPENDIX

CLAIM ON APPEAL

5. A method for producing dual-phase steels from the hot-rolled state with a two-phase microstructure of 70 to 90 % ferrite and 30 to 10 % martensite by a controlled temperature guiding and defined cooling strategy during the cooling of the steels, inter alia by means of water cooling after their finish rolling, wherein in a first cooling stage at a first cooling rate the cooling curve enters the ferrite region and in a second cooling stage at a second cooling rate faster than the first slow cooling rate further cooling is carried out to temperatures below the martensite starting temperature, the method comprising the steps of :

carrying out the first cooling stage at a cooling rate of 20-30 K/s in a cooling stretch comprised of several water cooling stages positioned successively at a spacing from one another;

allowing the cooling curve in the first cooling stage to enter the ferrite region at a temperature still so high that the ferrite formation takes place quickly; and,

before begin of the second cooling stage, which follows without intermediate air cooling and holding time directly after the first cooling stage, transforming already at least 70 % of the austenite to ferrite by continuing cooling of the first cooling stage during the transformation of the austenite into

ferrite up to the desired ferrite contents of at least 70 %.